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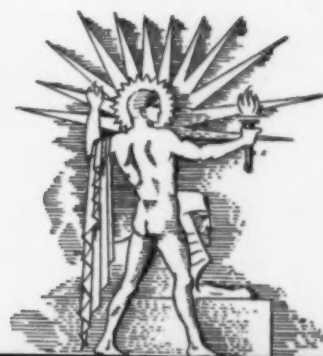
# SCIENCE NEWS LETTER

THE WEEKLY SUMMARY OF CURRENT SCIENCE •



Frost Filigree

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NOVEMBER 28, 1936

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## SCIENCE NEWS LETTER

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Summary of

## Current Science

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## DO YOU KNOW?

Cast rubber articles are being made in England.

The secret ballot was used by some Indian tribes in their tribal decisions.

Two scientists recording the calls of rare birds have succeeded in recording the call of the trumpeter swan.

Introduction of the white men's guns into some native communities has turned fairly harmless and frequent combats into deadly battles.

Indian water jars made of clay are purposely left porous because the evaporation cools the water, but if converted into flower vases these jars should be waterproofed with hot paraffin, asphalt, or varnish.

Mysteriously enough, black bears in the Great Smoky Mountains National Park have been breaking up new painted wood signs in the park, though they never molested the old unpainted signs with carved letters: oil in the paint is thought to be responsible.

Few insects shed their shells after their wings appear.

Dogs do not often like fish, unless they learn to eat it when young.

A typical abdominal segment of a caterpillar contains at least 150 muscles.

Woodchucks are called whistle-pigs in the Great Smoky Mountains of Tennessee and Carolina.

Less than 30 per cent of rainfall in the United States comes from the ocean—all the rest is the result of evaporation from the land, and transpiration of plants.

A California scientist has shown that ripening fruit matures as much as two to three weeks earlier if nights are warm than it does if the nights are cool.

Tuberculosis, the great plague among Alaskan Indians, takes a death toll of 655 per 100,000 a year, in contrast with 56 per 100,000 among whites.

## WITH THE SCIENCES THIS WEEK

Most articles are based on communications to Science Service or papers before meetings, but where published sources are used they are referred to in the article.

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MEDICINE

# Chemical Helps Body To Fight Streptococcus Infections

New Treatment Promises Aid Against Infections Such As Scarlet Fever and Erysipelas; Does Not Kill Germs

**F**IRST American use of a new chemical that promises to be a potent weapon against dangerous streptococcus infections, ranging from septic sore throats to scarlet fever, erysipelas and puerperal fever, was reported to the Southern Medical Association at its meeting in Baltimore.

Successful results of the treatment in 17 out of 19 patients and convincing laboratory experiments with mice were described by Drs. Perrin H. Long and Eleanor A. Bliss of the Johns Hopkins Medical School.

The medicine comes in two forms. One is a bright red solution for hypodermic injection, known by the trade name of Prontosil. The other is a tasteless white tablet to be taken by mouth, which looks like aspirin and is called Prontylin. The two are closely related chemically. They were first tried in Germany and are products of the German Dye Trust. Besides these two, Drs. Long and Bliss have tried other related chemicals. Chemists will know them as para-amino-benzene-sulfonamide and certain of its chemical derivatives.

The chemicals do not kill the dangerous streptococcus germs. But they check the growth of the germs and damage them so that they become ready prey to the disease-fighting white blood cells of the patient's body. For this reason, Dr. Long pointed out, the chemical treatment cannot be expected to succeed in patients very near death from the infection. The chemicals must have at least 36 hours to work in, and the patient must have enough fight left in his body to destroy the germs after the chemicals have damaged them and checked their growth.

## Many Diseases Affected

Theoretically the chemical treatment should work in any disease caused by hemolytic streptococci, including wound infections with streptococci. Actually the Baltimore investigators have treated patients suffering from erysipelas, infectious abortion, scarlet fever, acute tonsillitis caused by streptococcus infection, chronic cystitis, chronic impe-

tigo, infections of the eye following injuries, otitis media (inflammation of the middle ear), and mastoid disease with septicemia.

The chemical treatment has been used by numerous German and French physicians who all reported successful results. Dr. Long became interested last summer when he heard Dr. Leonard Colebrook of the English Medical Research Council and Dr. Méave Kenny and associates on the honorary staff of Queen Charlotte's Hospital, London, report their successful results with the treatment at a medical meeting in London. Dr. Long brought some of the chemicals back with him to Baltimore, as they were then not available in America.

Experiments were at once started with mice. Doses of virulent streptococci

which had never failed to kill a mouse were injected into the peritoneal cavity of these animals. The animals were then treated with Prontosil solution and all survived. Those untreated died of the streptococcus infection.

On Sept. 6 the first patient in the United States was treated with the chemical. Since then, 18 others have been treated, all but two recovering following the treatment. The Baltimore investigators expect to continue the work during the coming winter.

They do not regard the treatment as a cure, because they have used it in so few cases that it is too soon to be that optimistic. Their results, however, and particularly the mice studies, have led them to say that the treatment "promises to be of value" and "warrants the careful clinical use" of the chemicals "in the treatment of human beings ill with infection due to beta hemolytic streptococcus."

The "careful" use means that physicians must watch the patients being treated with the new chemicals. The chemicals are relatively non-poisonous, but too long continued use may result in fever and symptoms of poisoning, and possibly other, as yet unknown, harm. The chemicals were given to one normal person who



## WHO IS HE?

Not the member of some hooded order, nor even a deep-sea diver. He is a worker engaged in sandblasting at the plant of the Briggs Manufacturing Company, and his costume is designed to protect him from the resulting dust.



developed headache and fever of 102 degrees Fahrenheit within twelve hours, from which he quickly recovered.

The Baltimore investigators feel it is important to give a large amount of the chemicals during the first 24 hours of treatment. Usually they gave them in divided doses: first a dose of Prontylin in tablet form, to be chewed up and followed by a drink of water, and later injections of Prontosil solution. The method for calculating the dosage according to the body weight of the patient was given the physicians at the meeting. The physicians were also cautioned against giving any saline laxatives during Prontosil treatment.

### Case Reports

Among the cases reported by Drs. Long and Bliss were the following:

A 33-year-old patient at the Johns Hopkins Hospital suffering from infectious abortion with pelvic peritonitis. Beta hemolytic streptococci found in the uterus. The patient was gravely ill with a temperature of 106.4 degrees Fahrenheit on the day of treatment with Prontosil. She had two transfusions of citrated blood. Temperature was normal 17 hours after beginning of treatment. Recovery from the infection was uneventful.

A seven-year-old girl at the Union Memorial Hospital, Baltimore, suffering with erysipelas in the left leg. The child was gravely ill, the erysipelas spreading in spite of transfusion and antitoxin. Prontosil was given on the third day of illness and the temperature was normal within 28 hours. Recovery uneventful.

A 24-year-old young woman at the Johns Hopkins Hospital suffering with acute tonsillitis due to beta hemolytic streptococcus infection. Prontosil was given by mouth and hypodermically on the fourth day of illness. In 30 hours the temperature was normal and in 48 hours the throat was normal. The patient was discharged on the fifth day of the illness with throat cultures negative for beta hemolytic streptococcus.

### Infected Ears

A 6-year-old girl, patient at Sydenham Hospital (contagious disease hospital of the Baltimore City Health Department) suffering with scarlet fever, cervical adenitis (infected glands) and otitis media in both ears. The ear drums had been lanced a number of times and both ears were discharging pus abundantly. She had a septic type of temperature, running up to 104 degrees Fahrenheit. Prontosil was given by mouth.

The temperature fell to normal in 24 hours and the ears were clear in three days.

*Science News Letter, November 28, 1936*

### MEDICINE

## 35 Per Cent Success in Use of Spray for Polio

**A**BOUT one-third of those persons who used the alum picric acid nasal spray as a preventive of infantile paralysis during the epidemic in Southern states last summer were protected against the disease by this spray.

This appears from the first report of results with the spray. The report was given by Dr. Charles Armstrong, U. S. Public Health Service officer who developed the spray, at the meeting of the southern branch of the American Public Health Association.

While these results are somewhat disappointing to Dr. Armstrong and his associates, investigations are now under way which it is believed will give a more effective method of prevention in time for use next summer. Improvements along two lines are expected. One will be to make the chemical solution less irritating. The other will be to improve the method of administering it.

The picric acid-alum solution when sprayed into the nose acts to protect against infantile paralysis by setting up a barrier so that the virus cause of the disease cannot get through the lining of the nose to the olfactory nerve along which it makes its way to the brain and spinal cord.

### Monkeys Protected

Monkeys—24 out of 25—have been protected against the disease by this method. The spray was used on a large scale on children and young adults during the outbreak in the South last summer. Since September, Dr. Armstrong has been gathering reports on its use. The fact that it was used by laymen as well as physicians complicated the situation considerably, because the layman in many cases did not use the spray as effectively and thoroughly as a physician would have. The results show, among other things, that the method is not suitable for use except by physicians, Dr. Armstrong commented.

A house-to-house survey was made of 20 representative districts in Birmingham and 7 districts in surrounding Jefferson County. In this group, 5,010 persons out of a total of 8,093 used the

spray at least once. (The directions were to use it every other day for a week and then once a week for the duration of the epidemic.) If the same rates prevailed in the entire area of Birmingham city and Jefferson County, 270,000 persons were sprayed and 160,000 were not, it is calculated.

In the sprayed group 7 cases of infantile paralysis developed. In the unsprayed group, 8 cases developed. Calculating the number among the sprayed group who might have been expected to get the disease on the basis of the percentage among the unsprayed who developed it, Dr. Armstrong got a ratio of 16 to 21.7. This indicates that about one-third, or 35 per cent, were protected by the spray.

Untoward symptoms and transitory complaints of headache, nausea, burning of the nostrils and the like were reported by 885 of 4,631 sprayed persons. In the entire area where the spray was used, 7 cases of hypersensitivity to the spray were reported. All of the persons reporting unpleasant effects recovered from them.

*Science News Letter, November 28, 1936*

### SURGERY

## Discover Safe Kind of Surgery for "Bleeders"

**A** SAFE method of performing surgical operations on "bleeders" and a sort of automatic safety mechanism within their own bodies which helps protect them from fatal hemorrhage were described by Dr. Barnes Woodhall, resident surgeon of the Johns Hopkins Hospital, to the meeting of the Southern Medical Association.

This new knowledge was obtained from experience with a young Spanish lad who suffers from hemophilia, the dangerous hereditary malady which also afflicts male members of the family that once ruled Spain. The Count of Covadonga, formerly heir to the Spanish throne and a sufferer from this disease, nearly died recently of a hemorrhage that followed a minor surgical operation. Electrosurgery might have spared him this almost disastrous experience, it appears from the cases Dr. Woodhall reported.

By using a high frequency electroscalpel and coagulation unit, which seals the blood vessels as the tissues are cut, surgeons at the Johns Hopkins Hospital were able safely to amputate a thumb of the (Turn to page 349)

STANDARDS

# Bureau of Standards Builds Testing Unit for Scales

## Local Authorities at Present Lack Facilities For Testing Vehicle Scales Weighing Coal and Other Loads

SCIENTISTS at the National Bureau of Standards have come to the aid of state and local officials responsible for checking weights and measures. A new motor truck scale testing unit is soon to go on extended tour. It will check the performance of scales that measure loads up to 38,000 pounds.

Millions of dollars in coal and other bulk commodities change hands each week on truck loads of 14 tons and more. Checking the scales which weigh these loads is almost a completely blank spot in the duty of authorities to prevent fraud in short weight. It is estimated that 90 per cent of the weights and measures jurisdictions in the nation do not have proper testing equipment to make frequent tests of the heavy-duty scales being used.

The National Bureau of Standards' new testing unit is designed to demonstrate, for the various states and large communities interested, possible inaccuracies of their large scales. It is hoped that when the situation has been revealed state legislatures will realize the necessity of duplicating the equipment for their own use. In this sense the coming tour of the giant truck and its fifteen 1,000-pound standard weights will be missionary work designed to improve a serious situation.

The trend of recent years to carry larger and larger motor truck loads and the increased volume of truck transportation have spurred the National Bureau of Standards in its development.

### Operation Explained

R. W. Smith, chief of the Bureau's division of weights and measures, explained the operation of the new testing unit to Science Service.

A 23,000-pound truck carries the fifteen 1,000-pound standard weights to the scale to be tested. A hoist lowers the 1,000-pound weights singly to one end of the scale platform. The scientists thus check the scale from the range of zero to 15,000 pounds.

Then by a small special rubber-tired, two-wheeled cart the weights are transferred to the other end of the scale one

by one and the other end checked for the same range. Checking of each end separately is desired since the ordinary scale contains mechanisms at each end which combine to give the total weight.

### Up to 38,000 Pounds

Following this part of the test, explained Mr. Smith, the weights are removed from the scale and the heavy truck rolled on. The scale is then balanced when its load is around 23,000 pounds. Then the hoist lifts the weights, one at a time, back to the truck and the range from 23,000 to 38,000 pounds is thus checked.

The allowable error in a weighing of 40,000 pounds is only 80 pounds, or .2 per cent. Frequent checking is needed

on heavy duty truck scales to maintain this accuracy. Testing equipment like the new Bureau of Standards unit is needed to see that commerce is protected in such weighing.

*Science News Letter, November 28, 1936*

ETHNOLOGY

## Navajo Rugs Flawless; Indians Lose Old Fear

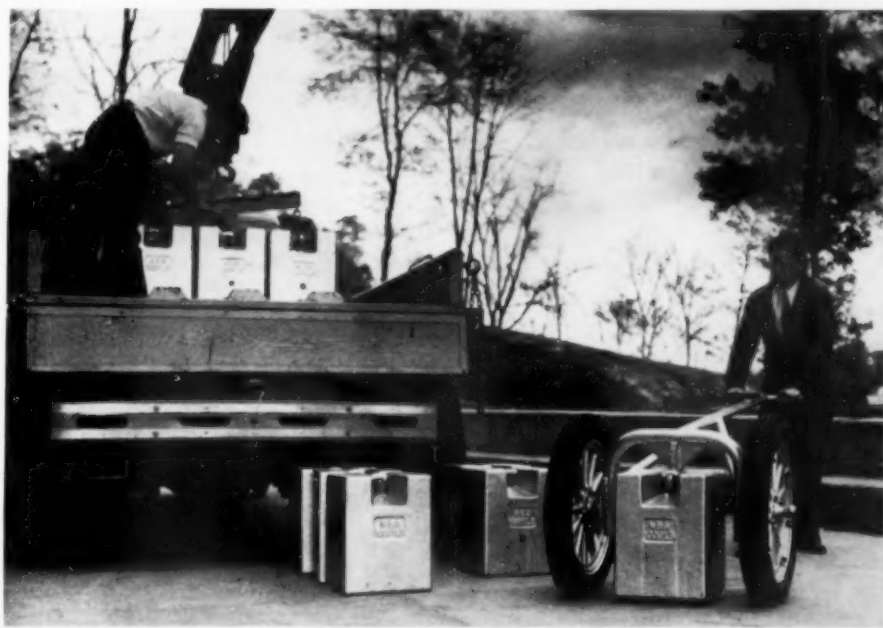
YOUNG Navajo women have no old-fashioned Indian fear of being perfect, and as a result many Navajo rugs are now being woven without the intentional flaws that old weavers used to slip into the designs.

Old Navajo Indians believe that any woman who weaves a perfect thing will die, according to Fern E. Harris, home economics teacher, telling of Navajo weaving progress in the federal publication, "Indians at Work."

"Any one attaining perfection is prepared for a world beyond," adds Miss Harris to explain this Navajo belief.

Most of the younger generation, she finds, have lost faith in the idea that perfection is deadly, and such flaws as occur in their work are merely mistakes that they do not trouble to correct.

*Science News Letter, November 28, 1936*



TO TEST VEHICLE SCALES

C. F. Horton, right, and R. W. Crouch of the division of weights and measures at the Bureau of Standards demonstrate new equipment which will test public and private scales in a nationwide tour. The giant truck carries 15 cast iron weights of 1,000 pounds each which test the scale from zero to 15,000 pounds. Then the truck, weighing about 23,000 pounds, is run on the scales and the 1,000-pound weights added to bring the test up to its full range of 38,000 pounds. The small cart which Mr. Horton is operating is so designed that a small boy can easily lift and wheel around the 1,000-pound test weights.

GENERAL SCIENCE

# Unborn Guinea-Pigs Now Aid Study of Disease Resistance

Animals Before Birth Grow Less Susceptible to Infection; All React in Same Way as Their Parents

**G**UINEA-PIGS do not even wait to be born, now, before they go to work in the laboratory, as the living instruments of scientists in their unceasing search for the causes of human ills and means for their prevention and cure. At the University of Ohio a group of bacteriologists have been using unborn guinea-pigs and rabbits to gain better knowledge of how germs attack and how living cells and tissue defend. At the meeting of the National Academy of Sciences, their leaders, Drs. Oram C. Woolpert and N. Paul Hudson, described their research and outlined some of the preliminary results.

By a relatively simple surgical procedure, performed under anesthesia, the Ohio biologists introduced the causal organisms of tuberculosis, infantile paralysis, cowpox, and several other human diseases into unborn guinea-pigs and rabbits at various stages of development. After a number of days or weeks, they brought them into the world by means of cesarean operation, and studied the results.

Dr. Woolpert summed these up briefly, as answers to six questions:

## Six Questions

(1) Are unborn animals generally susceptible to infection? "Yes. We have found that the effects of inoculation can be uniformly related to the specific infectious organism employed and that they are usually proportional to the concentration of the inoculum. In all instances the fetuses have proved as susceptible as adults of the same species and in many instances they have appeared definitely more susceptible." The only exception found was in the resistance of unborn rabbits and guinea-pigs to the virus of infantile paralysis; but this may be explained by the resistance shown by the adult animals as well.

(2) Why are unborn animals often more susceptible? To this question Dr. Woolpert did not make a categorical answer, but suggested, first, the con-

siderably lower number of phagocytes or germ-killing cells in the blood of unborn and very young animals, second, the known susceptibility of all young and rapidly-growing tissues, and finally, the lack of any stimulus to build up resistance, such as is furnished to adult animals by the constant insidious attacks which they must as constantly throw off.

(3) Are younger fetuses more susceptible than older ones? "Certain of our experiments . . . lend support to the view that the more immature the fetus, the more susceptible it is. It is unlikely that any tissue is entirely without resistance to infection, but we suspect that resistance is minimal in the youngest embryos and that during fetal growth the potentialities of resistance gradually increase."

## Same Reaction

(4) Are the reactions of unborn animals to infection attacks different in kind from those of the adult? They do not seem to be. Tubercles appeared in guinea-pig fetuses inoculated with tubercle bacilli, and in other ways the unborn animals reacted along the same patterns as their parents, the differences being quantitative rather than qualitative.

(5) What relationship is there between immunity in the mother and in her unborn young? "This probably depends very largely on the species of animal considered, as well as the fetal age. In certain animals, e.g., man and rodents, the placental tissue barrier between maternal and fetal circulations is more tenuous than in others, e.g. herbivora and carnivora. Also, as the placenta matures it becomes more permeable; thus the younger the embryo the more effectively it is isolated from maternal influences. Another reason thus presents itself for inferring that younger fetuses should prove more susceptible than older ones."

(6) Are bacteria and disease viruses changed in any way by having lived in fetal tissues? "The infectious agents

which we used were not greatly modified by transfer through series of fetal animals, though there are minor exceptions to this statement."

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PHYSIOLOGY

## Hearts Are Efficient; Stomachs Are Not

**H**EARTS are efficient machines. In fuel economy they are twice as efficient as modern steam or gasoline engines. A healthy mammalian heart can convert 20 per cent of the energy latent in its supply of food fuel into useful work. The best fuel efficiency of a steam engine is 10 or 11 per cent; under ordinary working conditions steam engines usually function at about 5 or 6 per cent. A good internal combustion engine realizes a fuel efficiency theoretically about as high as that of the heart—20 per cent or even better—but under usual working conditions its actual output also drops to about half its theoretical possibilities. But the good sound heart still keeps on pumping away at 20 per cent fuel efficiency.

The high mechanical efficiency of the heart was discussed by Prof. Maurice B. Visscher, of the University of Minnesota Medical School, before the National Academy of Sciences.

Prof. Visscher was able to isolate living hearts of laboratory animals in such a way that he could measure the oxygen going in and the carbon dioxide coming out. This gave him data on which the fuel consumption of the heart could be calculated.

Among other things, he discovered that in one type of failing heart, the effort was made to keep constant the amount of blood pumped by dilating more and more, thereby greatly reducing the mechanical efficiency. Doses of the standard heart remedy, digitalis, corrected this tendency by "tightening up" the heart muscle fibers as they grew slack. A heart undergoing this type of failure could suffer a loss of efficiency to a point as low as one per cent, as compared with the 20 per cent efficiency of the normal healthy heart.

## Not Good Factories

The stomach and pancreas are not particularly efficient chemical factories, Prof. Martin E. Hanke of the University of Chicago informed the academicians. As measured by the amount of energy intake, the stomach is only about ten per cent efficient in producing hydrochloric acid used in digestion, and the



pancreas has about the same rating in its production of pancreatic juice.

### Thermostat Under Brain

There is a thermostat under the brain, that regulates body temperature. Experiments on monkeys demonstrating its existence were described to the Academy by Dr. S. W. Ranson of Northwestern University Medical School.

The temperature-regulating mechanism is in the hypothalamus, a group of structures on the under side of the brain, running back toward the base of the spinal cord; it includes, among other things, the pituitary gland, now famous as the "boss gland" of the body.

Cats and monkeys in which the hypothalamic region had been injured were used in the experiments. Those in which the injury was toward the front part of the region would heat up rapidly if placed in warm incubators, running temperatures as high as 103 to 105 degrees, without sweating. They seemed, however, to be able to bring their body warmth up if they were subjected to subnormal outside temperatures. However, when the injury was located toward the rear of the hypothalamus, the animals could not compensate for cold, and data thus far accumulated seem to indicate that they are also unable to protect themselves against heating. They have become in effect cold-blooded animals, like reptiles and fish.

### Juvenile Sex Hormones

Grafting salamander tadpoles together to form artificial Siamese twins has proved the existence of juvenile sex hormones quite different from those of adulthood, Prof. Emil Witschi of the University of Iowa declared. When immature salamanders of opposite sex were thus grafted together, the ovaries of the female were first practically suppressed by the secretions introduced into her blood stream by the male. Later, male-like secondary sex characters appeared on her body, induced by the maturing male's adult glandular secretions.

### "Grappling Bridge"

A typical four-legged animal, like a horse, is structurally a combination of bridge, steam shovel or dredge, and automobile, in the evolutionary analogy presented at the Academy's principal evening lecture by Prof. William K. Gregory of the American Museum of Natural History. The legs are the piers, the backbone a sort of cantilever arch, the neck is a crane, ending in the grab

bucket of the mouth. Prof. Gregory coined the descriptive phrase, "self-moving grappling-bridge," to cover the whole situation.

As for man, he is physically a quadruped turned up on end. "A comparison of the skeleton of *Homo sapiens* with those of his nearest subhuman relatives shows that he has longer legs and shorter arms and that his cranium has become greatly inflated," Prof. Gregory said.

### Surgical Mistake

Cutting a nerve to put the adrenal glands out of action, in cases of high blood pressure, is a major surgical mistake, Dr. J. M. Rogoff of the University of Chicago indicated. It does reduce the pressure, but it induces Addison's disease, a much worse ailment, which kills the patient off much more quickly.

*Science News Letter, November 28, 1936*

### ASTRONOMY

### "Nervous System" Guides Eye of a Telescope

WHILE biologists were discussing the mechanisms of life before the National Academy of Sciences, an almost-living electrical mechanism was being described by the two astronomers who are its creators, Drs. A. E. Whitford and G. E. Kron of the Washburn Observatory, University of Wisconsin.

Their device is designed to perform one of the most precise, exacting, and wearisome tasks that at present burdens some of the most skilled eyes, nerves, and fingers in the world—keeping great telescopes trained with split-hair's-breadth exactness on a star during the long hours required to make an astronomical photograph. At present, astronomers must sit by their instruments as a gunner sits by his cannon, keeping the sighting crossed hairs undeviatingly on the same tiny spot of light, while all the rolling world sleeps about them.

But with the automatic guider now under test in the Wisconsin observatory, all this precise and tedious labor is delegated to a photoelectric cell. The astronomer picks up a star that is to serve as guide. Its light is divided into two beams by a reflecting knife edge, and the two beams are made to shine alternately on the light-sensitive surface of the cell. If the star is not perfectly centered on the knife edge one beam will be brighter than the other and there will be a flickering intensity.

Suitably amplified, this flicker controls a motor which makes the proper correction to center the star on the knife edge and reduce the flicker to zero.

Naturally, such an electromechanical system is almost unimaginably delicate and has offered its share of troubles. Said Dr. Whitford:

"The principal difficulty is the extremely small amount of light available to actuate the mechanism, so that the feeble impulse from a star must be amplified as much as a billion billion times (10 to the 18th power, or 1,000,000,000,000,000,000). This amplification is so great that the graininess of electricity is a serious limitation, that is, the original photoelectric current is not a steady stream but a procession of irregularly spaced electrons. The use of the new Zworykin electron multiplier has made it possible to extend the working limit somewhat beyond that attainable by conventional methods of amplification. The control is exercised entirely through electron tubes, without mechanical relays.

"The instrument is still in the experimental stage, but successful preliminary tests have been made on the 60-inch telescope of the Mount Wilson Observatory using stars down to the eighth magnitude. Artificial errors were introduced into the driving mechanism of the telescope, but the guider continuously corrected them and produced satisfactory star images."

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### BIOLOGY

### Biology and Engineering Attack Basic Food Problem

BIOLOGY and engineering have united both points of view and methods of attack, for efforts toward the eventual solution of the world's basic food problem—the problem of chlorophyll.

Chlorophyll is the green stuff in plant cells that captures the energy of sunlight and uses it to tie water and carbon dioxide together to form sugars and starches. It is a large-molecule, complex substance, related chemically to the red hemoglobin of our own blood. Not very much is known, as yet, of how it works, or of how it is formed in the growing plant.

These and related problems are under attack in many laboratories. Among the most notable of research teams that have tackled chlorophyll is the group working at Antioch College, Ohio, on the Kettering Foun- (Turn to page 350)

## METEOROLOGY

**Commonplace Transformed Into Beauty by Frost**

See Front Cover

**C**HILDREN find in the work of frost, on windowpane or wayside pool, an endless source of wonder and delight. As we grow older, we unfortunately lose this pristine capacity for marveling at beauty too often repeated. But once in a while the beauty is so stressed and underlined, as in the photograph that adorns the front cover of the present issue of the SCIENCE NEWS LETTER, that for a breathless moment we regain our childhood eyes. Only crystals of solidified water on the leaves of a common kitchen herb, yet beauty such as no Cellini could ever quite capture in even the most obedient of silver.

*Science News Letter, November 28, 1936*

## CHEMISTRY

**Peat Used as Fertilizer On German Farm Land**

**T**HE USE of peat for fertilizer is expanding rapidly in Germany, reports the American Consulate General there. A peat base product containing 3 per cent each of nitrogen, phosphoric acid and potash is being marketed.

*Science News Letter, November 28, 1936*

## ENGINEERING

**Highway Scientists Urge More Banking on Curves**

**M**ORE than 900 road tests have been made by scientists at speeds up to seventy miles an hour to check the amount of bank needed on highway curves. The tests are part of the work of the committee on the Relation of Curvature to Speed of the Highway Research Board.

Joseph Barnett, senior highway design engineer of the U. S. Bureau of Public Roads, as chairman of the committee, revealed the report.

Aim of the investigation was to find the minimum speed at which side pitch is felt by the driver or passengers in rounding a curve. It was assumed that an ample margin of safety would still exist if the car did not exceed this side pitch speed.

Side pitch was felt at lower speeds on wet pavements than on dry ones. Cars with individual front wheel suspension showed side pitch at lower speeds than did those with the standard front axles, disclosed Mr. Barnett.

From its findings, the committee urged that highway curves be super-elevated, or banked, wherever possible so that the centrifugal force would be counteracted for speeds equal to three-fourths of the assumed design speed of the curve.

The potential results of this practice, said chairman Barnett, were:

1. Aid to slow moving vehicles without penalizing faster moving vehicles.
2. A safer highway when all traffic moves slowly due to the pavement being slippery from rain or ice.
3. No effect in future redesigns to reasonably higher speeds.
4. Greater uniformity of curve design and a more pleasing appearance.

*Science News Letter, November 28, 1936*

## METEOROLOGY

**Aviation Weather Forecasts Set Style for Service**

**N**EEDED of commercial aviation for immediate and detailed weather information, kept right up to the minute, rather than the looser, more generalized reporting for a whole day at a time that was thought good enough before men trusted themselves and their goods to the upper air, is bringing about a revolution in weather service for non-flying purposes too, states W. R. Gregg, chief of the U. S. Weather Bureau, in his annual report.

The new type of weather reporting is of course costlier than the old, but it is absolutely indispensable if flying is to be carried on in safety. And now the same kind of weather information is beginning to be appreciated as valuable by shipping interests, farmers, dairymen, promoters of athletics and other forms of outdoor entertainment, and many other people.

Demands on the Weather Bureau during the past year have been abnormally heavy, because of the variety and violence of the weather during the period covered by the report. Unusual winter cold, blizzards, spring floods, blazing summer heat, desperate drought—all these have called for special surveys, reports, maps, and the Bureau has supplied them.

The Weather Bureau looks toward the future, too, Mr. Gregg indicates. Special attention is being paid to two modern developments in meteorology, the method of air mass analysis, and efforts to learn weather trends farther ahead than the few days that at present limit reliable forecasting.

*Science News Letter, November 28, 1936***IN SCIENCE**

## MEDICINE

**Medical East Meets West In Modern China**

**O**LD-FASHIONED medicine and new are in sharp contrast in China.

Sick people in China may still be seen going to the temple of the god of barbers to get a prescription, according to Orientalists at the Field Museum of Natural History. Around the temple wall are displayed 100 prescriptions for men, 100 for women, and 100 for children, and presumed to include healing for all the ills of mankind. The patient shakes a receptacle containing numbered bamboo sticks until a numbered stick falls out. Then the sick person is given a printed prescription matching that number by the priest, and goes off to get it filled by an apothecary.

The modern scientific spirit in China is typified by a society in Nanking for "popularizing medical knowledge and introducing new discoveries." This society introduces modern medicine to the Chinese public by publishing a magazine.

*Science News Letter, November 28, 1936*

## SEISMOLOGY

**Strong Earthquake Near Coast of Guatemala**

**A** STRONG earthquake shook the Central American republic of Guatemala on Thursday afternoon, Nov. 19, centering on or near the Pacific coastline, the U. S. Coast and Geodetic Survey determined from an examination of data collected telegraphically by Science Service. The epicenter was in latitude 14 degrees north, longitude 91 degrees west; time of origin was 4:10.3 p.m., eastern standard time.

Stations reporting were: State College of Pennsylvania, University of Michigan, University of California, the Dominion Observatory at Ottawa, the Dominion Meteorological Observatory at Victoria, B. C., Fordham University, Canisius College at Buffalo, and the observatories of the U. S. Coast and Geodetic Survey at Ukiah, Calif., and Tucson, Ariz.

*Science News Letter, November 28, 1936*



# EN FIELDS

## CHEMISTRY

## Juice of "Melon Tree" To Tame Tough Steaks

CIVILIZED man is at last going to have a chance at a cooking aid that South Sea Islanders have enjoyed for centuries. A commercial company in Cincinnati, Ohio, is preparing to put up the juice of the papaya tree in retail-size bottles, for home use in tenderizing tough cuts of meat.

The juice of this tree, sometimes called the melon tree because of the shape of its tasty fruit, contains a vegetable analogue of pepsin, that has the power to digest proteins. For a long time this substance, known to the pharmacist as papain, has been a standard ingredient of indigestion remedies. But although the brown natives of the warmer islands of the world have long been known to use the juice in its crude state to make meat more digestible before they cooked it, no effort has been made until now to make it available as a white man's cooking aid.

Papayas have been grown in Florida on a modest scale for their fruits, which are now beginning to make their way even into northern markets. Because the fruit is sometimes called pawpaw, there has been a tendency to confuse it with the native American pawpaw, which it does not at all resemble and to which it is not related.

*Science News Letter, November 28, 1936*

## RADIO

## Natural Color Television Forecast by New Patent

THE achievement of television in natural color is claimed in a patent (No. 2,055,557) granted to D. E. Replogle, of Leonia, N. J. The patent is assigned to the Radio Corporation of America.

As in colored motion pictures using a two-color process, the scene or picture to be transmitted would be split up in two "ranges of color values." Thus there would be two television cameras; one would scan the scene through a green filter; the other through a red filter.

Each would convert the color values representing the televised scene into corresponding electrical impulses that would be simultaneously broadcast over two separate channels.

At the receiving station, two synchronized television receivers, one for each channel, would pick up the incoming impulses. Those coming over the "red channel" would be picked up by the "red" television receiver which would reconvert the received electric impulses into a red-colored image, corresponding to the red rays of the original scene or picture.

The "green" receiver would give a corresponding green image. The two images, red and green, would be combined or synthesized by means of prisms and mirrors, so that a person looking at the television screen would see a single reproduction, in natural color, of the original scene being televised.

The system, claims the inventor, can also be used for transmitting colored pictures over wires, as in wire-photo, widely used by newspapers.

*Science News Letter, November 28, 1936*

## PALEONTOLOGY

## Fossil Brain of Peccary Found in Northwest

DISCOVERY of the fossilized brain of a primitive pig-like animal, the Oreodon, which existed in the western United States during early eocene times, some 40 million years ago, has just been reported by Irving G. Reimann, curator of geology at the Buffalo Museum of Science.

Mr. Reimann discovered the brain while collecting the remains of these extinct peccaries at a famous locality near Scenic, S. D., in the Badlands. He found the place well picked over when he arrived, with fragments of bones littering the ground. As he was turning away with disappointment, he noticed the skull of an Oreodon, badly weathered. As he picked it up, the top of the cranium came off, revealing an excellent cast of the brain. The various areas and convolutions could be recognized.

Although brain-casts of extinct fossil animals are not unique, they are sufficiently rare to interest scientists. Usually the task of freeing the fossil brain from its outer covering is very difficult, but in this case the outer bone crumbles easily. Mr. Reimann expects to work out the brain without injuring it.

The Oreodon was about the size of a shepherd dog, and once roamed the western plains in large droves.

*Science News Letter, November 28, 1936*

## MEDICINE

## Virus Plus Bacterium May Cause Influenza

POSSIBILITY that influenza may be caused by the combined action of a virus and a larger disease germ, a bacterium, was discussed by Dr. Richard E. Shope of the Rockefeller Institute for Medical Research at a meeting of the Yale Medical Society.

Dr. Shope has investigated swine influenza, a disease much like human influenza. He and his associate, Dr. Paul A. Lewis, found that the swine disease is caused by the concerted action of a virus and a bacterium. While this suggests that the same mechanism is involved in human influenza, there is no way as yet, Dr. Shope said, of telling whether human influenza is a pure virus infection or whether, like the swine disease, both the virus and a bacterium are essential to its causation.

In the swine disease, the bacterium is similar in all respects to that found in human influenza by Pfeiffer in 1892. Until the 1918 influenza epidemic, this bacterium was considered the cause of human influenza. Research during and following the 1918 epidemic threw much doubt on the theory that influenza was caused by this bacterium. Recently workers in England and America have found a virus that plays a rôle in causing influenza.

This human influenza virus is not the same as the swine influenza virus, although the two viruses cause identical disease pictures in mice and ferrets. The swine flu virus does not cause disease in man now, but there is evidence that at some time in the past it did infect man. The theory has been advanced that the swine virus represents the surviving prototype of the virus responsible for the 1918 human influenza epidemic.

*Science News Letter, November 28, 1936*

## MEDICINE

## Snake Serum for Tourists Sold in Czechoslovakia

TOURISTS in Czechoslovakia can now buy serum for viper snake bites from the State Serological Institute, according to a report received by the U. S. Bureau of Foreign and Domestic Commerce. An injection syringe and 10 cubic centimeters of serum are sold in a unit.

*Science News Letter, November 28, 1936*

ASTRONOMY

# December Brings Eclipse

## Crossing International Date Line, Solar Veiling Begins a Day After It Ends; Winter Arrives

By JAMES STOKLEY

**T**HOUGH Jupiter has left the evening sky, the other two planets—Saturn and Venus—which have been visible during the autumn are still present, and Venus is getting brighter. In fact, it is now, with the exception of the moon, the most brilliant celestial object seen in the night sky. It is in the constellation of Capricornus, in the southwest just after twilight is over. Because it sets before the times for which the maps are drawn (10:00 p.m. on Dec. 1, 9:00 p.m. on the 15th, and 8:00 p.m. on the 31st) it is not possible to indicate it there, except for the end of the month.

Saturn is in the constellation of Aquarius, to the southwest, and is unusually faint, because the plane of its thin, flat system of rings is this month in line with the sun, and consequently they are not as well illuminated as they were a few years ago. Then the sunlight reflected from the rings contributed a considerable share to the total brightness of the planet. In spite of this, it is still as bright as most of the stars and can easily be recognized.

The third planet of the month may be glimpsed during Christmas week. On Dec. 29, Mercury is at its greatest distance east of the sun, and will go below the horizon about an hour and a half after sunset. It will be visible below and to the right of Venus in the twilight for a few days around this date.

Much later at night another planet appears, namely Mars. Rising about 2:00 a. m., in the constellation of Virgo, its red color will make it easily apparent to anyone who happens to be watching the eastern sky at that hour.

### Brightest Sirius

The winter display of stars is returning, mostly to the southeast. Brightest of all is Sirius, the dog star, in Canis Major, the great dog, which is near the horizon. Above it are three stars in a nearly vertical row. These form the belt of Orion, the warrior. The bright, rather ruddy, star to the left is Betelgeuse, and the one to the right is Rigel. Above Orion can be seen Taurus, the bull, with red Aldebaran to mark his eye. This is

a member of a V-shaped group, called the Hyades, and above these is a smaller, cluster of six stars, the Pleiades.

Almost directly east, and near the horizon, is Procyon, marking the lesser dog, Canis Minor. Climbing upwards from this group, we pass through Gemini, the twins, Castor and Pollux. The latter star is the brighter of the two, and occupies the lower position. Then comes Auriga, the charioteer, with Capella.

### Pegasus

Resting upon a corner, to the west, is the great square of Pegasus, but the star in the upper corner is Alpheratz, in the neighboring group, Andromeda. High in the north is Cassiopeia, shaped like an inverted W. In the northwest, the northern cross of Cygnus, the swan, with Deneb at its top, is sinking out of sight. Quite low in the northwest Vega appears, in Lyra, the lyre. The great dipper is beginning to climb in the northeast, the tip of the handle still scraping the horizon.

On Dec. 13 occurs the year's second, and last, eclipse of the sun. The first one, on June 19, was visible across

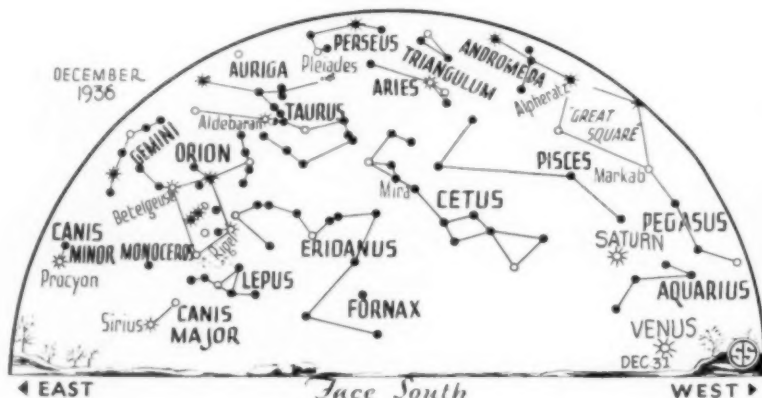
Europe, and Asia. Many of the world's astronomers were attracted to its path to make important observations. This month Australia, New Zealand, and the south Pacific are the favored regions, but astronomers will give it little attention.

### Not Total

The lack of interest comes because this month's eclipse is not total, but annular. That means that at no time will the sun's disk be hidden completely by the moon; its corona will not appear and none of the usual eclipse observations will be possible. Because of the slight change in the sun's distance during the year, at certain months it is apparently a little larger than others. The moon also changes its distance and its apparent size during the month.

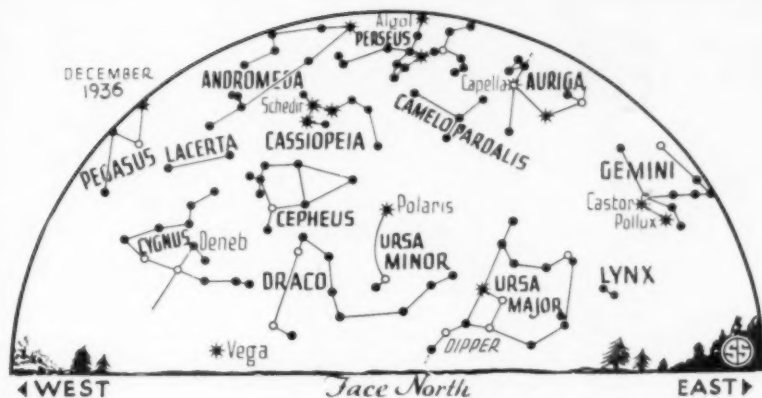
Total and annular eclipses occur when the sun and moon are in line with the earth. Their apparent diameters are about the same, and the variations in distance have the effect of sometimes making one look a little larger, sometimes the other. If the proximity of the moon makes it the larger, it completely covers the sun's disk and a total eclipse is the result, as happened last June. This month, however, the sun is almost at its closest of the year, making it look bigger than otherwise. The moon, on

☉ \* ○ • SYMBOLS FOR STARS IN ORDER OF BRIGHTNESS



### BRIGHTEST

*Venus, low in the west after sunset, is the most brilliant object in the heavens during the coming month. During Christmas week, look in the same neighborhood for the seldom seen Mercury. If you happen to be abroad at the romantic hour of 2 a.m., look low in the east for ruddy Mars.*



### IT NEVER SETS

*The great dipper is always to be seen in the northern skies, but this month it is so low that it grazes the horizon.*

the date of the eclipse, is only a few days past apogee, the time of its greatest distance of the month. Thus, even when the moon is seen squarely in front of the sun, it will not cover the latter's disk. A narrow ring of the sun will always remain in view. This is called the annulus, the Latin word for the ring, and hence such an eclipse is known as an annular eclipse.

### Crosses Date Line

Another interesting feature of this eclipse is that it begins on the day after it ends. Its path crosses the International Date Line. Here the new day begins. From this line the day gradually shifts westward, until after 24 hours it has encircled the world and the following day begins, to go through the same process. When the eclipse starts, off the northwestern coast of Australia, it will be sunrise of Monday, Dec. 14, for that day will several hours before have reached that point. In Auckland, New Zealand, it will be almost noon of Monday, when the sun is covered to the greatest extent. But then, as the eclipse view shifts eastward, it crosses the Date Line. Then it is afternoon, but of Sunday, because Monday is still some hours away. And when it ends, in mid-Pacific, it will be at Sunday evening sunset. Though this feature is curious it is not unusual, for many eclipse paths cross the Date Line, and whenever one does this condition obtains.

Perhaps of more interest to us will be the event of 7:27 p.m., Monday, Dec. 21. At that moment the sun reaches the southernmost position in the sky. This is called the winter solstice, and marks the beginning of winter. On that day the sun rises farthest to the south of the east point, climbs to the lowest noon day position of the year,

and sets farthest south of the west point. With its path across the sky so shortened, it takes it less time to get across than on any other date and this is the shortest day of the year.

The fact that the sun then shines on us for a shorter time than in summer partly accounts for the winter season. But the low altitude of the sun is even more important. Its rays fall upon the ground of the northern hemisphere at a low angle, and they are spread over a much larger area than in June, when the noon day sun is nearly overhead.

The moon's phases in December are shown below. It will be in apogee (farthest from earth) at 3:00 p.m. on the ninth, 252,100 miles away. Perigee, when it is closest of the month, comes at 4:00 p.m. on Christmas day, when its distance is but 225,900 miles.

### Phases of Moon

E. S. T.

Last Quarter . . . .	Dec. 5,	1:20 P.M.
New Moon . . . . .	Dec. 13,	6:25 P.M.
First Quarter . . . .	Dec. 21,	6:30 A.M.
Full Moon . . . . .	Dec. 27,	11:00 P.M.

*Science News Letter, November 28, 1936*

### MEDICINE

## Army Medical Library Celebrates Its Centennial

**A**N OUTSTANDING American institution is celebrating its hundredth birthday this year. Although relatively few Americans may ever have heard of it, its fame has spread all over the world.

This institution is the Army Medical Library, or, as it is also known, the Library of the Surgeon-General's office. It is housed in a modest red brick build-

ing adjacent to the Smithsonian Institution. Within this building may be found a collection of rare and historic medical specimens, photographs, and a veritable treasure mine of medical literature. The Library contains 1,000,000 items, 400,000 of which are books. It has been called "the best medical library in the world."

The Army Medical Library played an important part in the development of medicine in America and, according to Dr. Henry E. Sigerist, medical historian, "has made itself felt all over the world."

"It is probably the only case in history," Dr. Sigerist states, "where a military authority in one country has contributed so much to international knowledge."

The high esteem in which the library is held may be seen from the fact that Sir Humphrey Davy Rolleston, one of England's most eminent physicians, journeyed to this country especially to deliver the oration of the evening at the library's 100th birthday party, held in the library building in Washington on Nov. 16.

You can find in this library references to everything of importance on medicine and allied subjects that has ever been published in any language "since the world began." These references are available through the world-famous Index Catalogue which the library publishes. This Catalogue was started by the library's first librarian, John Shaw Billings, to whom also goes credit for building up the library itself.

The Index Catalogue was started in 1880. Since then three series, making up 47 large volumes, have been published. One series takes from 15 to 20 years to complete. Every year one volume containing 75,000 to 100,000 references is published.

Besides publishing the Index Catalogue, which goes to libraries and medical institutions all over the world, the library receives and makes available a vast store of medical literature. About 1,800 medical journals in 18 different languages are regularly received. Of the 600 known medical incunabula (books dating before 1500 A.D.) in the world, the library contains 450. It has the largest and most complete series of French theses on medicine to be found anywhere in the world. This collection is not even approached in France itself. The number of German theses on medicine in the Army Medical Library is even larger.

The work of the library is carried on by a staff of 26 persons.

*Science News Letter, November 28, 1936*



## BIOLOGY

# Behavior of Living Cells Linked to Mathematics

**T**HE mysteries of protoplasm, the secrets of life, seem far removed from the cold abstractions of mathematics. In the popular mind, biology and mathematical physics are about as far apart as any two sciences could be.

But scientists are not letting them remain so. One of those who, by means of mathematics, are increasing our knowledge of living matter is Dr. N. Rashevsky of the University of Chicago.

One of the foremost characteristics of a living thing is its ability to reproduce its own kind. In the simplest forms of life—in organisms consisting of a single cell—this is accomplished merely by the cell dividing into two. Food is absorbed through the cell wall and presently, when the individual has become quite "grown up," it splits into two and the process begins over.

One question which scientists must eventually settle is this: "How completely can the behavior of living cells be explained by our knowledge of physics and chemistry?"

In his work on this vital question, Dr. Rashevsky has not used test tubes, nor has he studied cells under a microscope. His only instrument has been high-powered mathematics. Among his many contributions so far has been the mathematical proof that certain tiny droplets of "non-living" matter will absorb "food" from a solution, will grow until a certain size is reached, and then will divide. And the size to which they grow is nearly the same as that of living cells.

## Remarkable Resemblance

While no forces or influences other than the well-recognized ones of physics and chemistry are invoked, his non-living "paper and pencil models" show remarkable resemblance to living cells.

A further resemblance is their inability to form spontaneously. They must either be created by some outside agency or else be natural offspring of their "parents."

Many living cells, of irregular shape when alive, become spherical after death. In this respect also has Dr. Rashevsky shown that non-living matter can do the same thing. That is, he

can design cells which will be non-spherical while absorbing food but which will become spherical if for any reason the food intake is stopped.

He would deny, however, that he has "explained" life processes. He has proved, nevertheless, that such processes as cell division do not necessarily involve any other influences than those which govern the behavior of non-living matter.

*Science News Letter, November 28, 1936*

## RADIO

## Months of Research Have Brought Television Near

**F**OUR MONTHS of field tests in television broadcasting from New York's Empire State building at the cost of a million dollars have brought television for the public nearer to reality.

The Radio Corporation of America and the National Broadcasting Company have drawn the veil of secrecy that has surrounded these engineering tests of modern, electronic television.

Despite the advances revealed, you won't be able to go downtown and buy a television set, plug it in and enjoy broadcast sight as well as sound. Not yet awhile.

Even the RCA-NBC engineers say that they have not yet finally designed the television sets that will be sold for the general public. The definition of the image, technically known as the lines, will be 441 in future public television instead of the present experimental 343 interlaced lines.

A decade ago there was a flurry in radio over the supposed imminence of commercial television. It was wonderful, the television of even those early days. But the systems and methods of so long ago have changed. Then television was mechanical and now it is electronic. Streams of electrons are key actors in television today.

Television as demonstrated by RCA was seen on a new 12-inch receiving tube. And the images were in black and white, instead of the greenish tone of previous cathode ray tubes. The screen was  $7\frac{1}{2}$  by 10 inches and a fairly large group could watch the show at the same time.

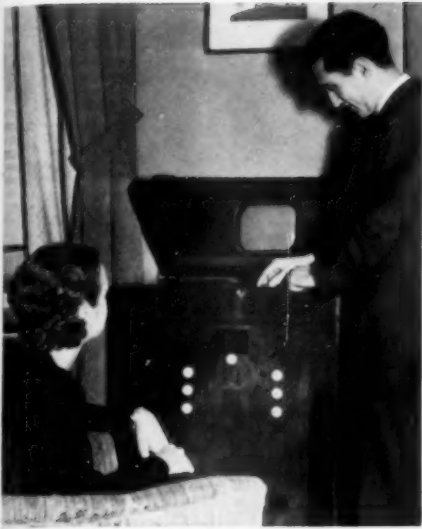
Image and sound were perfectly synchronized. To do this a system is necessary in which there are 1,400,000 impulses amplified and broadcast in one second.

*Science News Letter, November 28, 1936*



## GOING ON THE AIR

A television studio looks like a movie set with its lights and cameras. The camera at the left is mounted on a dolly so that it can be moved back and forth for distant or close-up shots without break in the broadcast. The microphone hangs high beyond the eye of the camera.



## COMING IN

Here is the 1936 television receiver. The mirror in the lid of the instrument forms a sort of screen, reflecting the images as they are received.

## From Page 340

16-year-old compatriot of the Count of Covadonga. A blood transfusion was given at the time of the operation as a precautionary measure. There was no hemorrhage either during or following the operation and the wound healed normally.

Removal of the thumb was required because hemorrhage into the joint had destroyed the joint and bone tissue and resulted in a tumor containing blood which was very painful and threatened to burst through the skin.

Coagulation of the tissues by electricity at the time of the amputation not only prevented hemorrhage but greatly reduced the clotting time of the patient's blood, Dr. Woodhall reported. The blood in hemophiliacs clots very slowly, and that is why small cuts or injuries may result in loss of so much blood that the patient dies. Before the amputation, a sample of the Spanish lad's blood took five hours to clot. After the amputation, this time was reduced to five minutes.

This suggested that the cauterization by electricity mobilized the thromboplastic substances in the body which make blood clot when it is shed following injury. To test this theory, a small portion of skin and tissues beneath it on the right thigh were partially cauterized a month after the amputation. On the third day following this, the clotting time had fallen from four and a half hours to three and a half

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hours, and on the fourth day to one and a half hours.

Following the experience with the Spanish boy, electrosurgical methods were used to extract an impacted tooth in another patient suffering from hemophilia. Seven of this patient's male relatives had died of hemophilia and two of his brothers had been treated in the hospital for the condition. Immediate hemorrhage following extraction of the tooth was completely checked by high frequency electrocoagulation, Dr. Woodhall reported.

This patient's case also showed the possible existence of an automatic safety mechanism that apparently at times protects bleeders from fatal hemorrhages and suggests a method of treating them. The day after the tooth extraction, the patient had two large hemorrhages under the skin. One was around the face, as a result of the local anesthesia given him, and the other involved his entire left arm following puncture of a vein for a blood test. Coincidentally with these hemorrhages, a marked fall in the clotting time of his blood occurred. A similar reduction of the clotting time had been noticed before on this same patient following hemorrhages under the skin.

The hemorrhage itself evidently called up extra blood-clotting thromboplastic substances which served to protect the patient from further dangerous bleeding. Injection of thromboplastic substances from the bleeder's own blood might, it appears, be a valuable procedure.

*Science News Letter, November 28, 1936*

## From Page 343

dation. This consists of an engineer, the noted Dr. C. F. Kettering, two physicists, Drs. Vernon Albers and Harry Knorr, a chemist, Dr. Paul Rothemund, a biologist, Dr. O. L. Inman, director of the laboratories, and several assistants. At the meeting of the National Academy of Sciences on the Campus of the University of Chicago members of this group reported newest progress.

One of the most important forward steps yet taken at their laboratory has been the synthesis, not of chlorophyll itself, but of one of its simpler building-blocks, porphyrin. With iron added, porphyrin becomes hemin, a blood pigment. With magnesium replacing the iron, porphyrin becomes phyllin, a green leaf pigment. A considerable number of porphyrin compounds have been elaborated, and in each it has been found possible to add either iron or magnesium

## ● RADIO

December 1, 5:15 p.m., E.S.T.

AMERICAN FURS—Frank Ashbrook of the U. S. Bureau of Biological Survey.

December 6, 5:15 p.m., E.S.T.

COAL AT WORK—Dr. A. C. Fieldner of the U. S. Bureau of Mines.

In the Science Service series of radio discussions led by Watson Davis, Director, over the Columbia Broadcasting System.

to the molecule, forming the blood and leaf analogues. The making of these compounds does not lead directly to the solution of the riddle of chlorophyll, but they do throw light on it, and also may yield information of value in other fields, such as chemistry and medicine.

### Seeking Precursors

Chlorophyll is an exceedingly complex compound, and quite certainly does not spring into existence at a single bound. But thus far almost nothing has been discovered of its beginnings. By very painstaking extractions from the leaves of plants grown in the dark, it has been possible to obtain a very small quantity of a "proto-chlorophyll," the chemical and physical nature of which is now under investigation.

Chlorophyll is not a single substance, but twins, known respectively as chlorophyll A and chlorophyll B. In ordinary green plants there is about three times as much of the A kind as of the B. But the Antioch scientists have lately discovered that in the pale leaves of plants grown in the dark there will be twenty or more parts of A to one of B. When the plants were exposed to the light and began to turn green, the proportions began to change, and to approach the normal 3-to-1 ratio.

Spectroscopic studies on chlorophyll have often been made with leaf extracts in a glass vessel, to see what kinds of light are absorbed—a most important matter for science, since the absorption of light and the transformation of its energy is chlorophyll's whole reason for being. But this was extracted chlorophyll—presumably dead chlorophyll. Drs. Albers and Knorr have tried an ingenious method for getting a spectroscopic reading on active chlorophyll still in the living cell. They placed one-celled green plants under a microscope, and then applied the spectroscope to that. They learned that chlorophyll has not one but several "favorite" wavelengths, which it absorbs more strongly than it does other light. These wavelengths are not the

same for all species of plants, nor even for different individuals of the same species. There seem to be several factors, as yet not understood, governing this "choiciness" on the part of chlorophyll.

*Science News Letter, November 28, 1936*

### EVOLUTION

## Jawbone of Unknown Beast Disputes Darwin's Theory

DARWIN'S natural selection theory got severely bitten by a 45 million year old jawbone at the meeting of the National Academy of Sciences.

The jawbone once belonged to an unknown beast of prey that roamed the American West in late Eocene times, quite early in the age of mammals. Dr. William Berryman Scott, noted paleontologist of Princeton University, told of the fossil and explained its significance.

The fossil, a lower jawbone, was sent to Dr. Scott for examination by the Carnegie Museum in Pittsburgh. At first it seemed to be a new species of sabertooth cat, though that in itself was surprising, for Eocene is much too early for such animals. But closer examination, especially of the teeth, showed that it was an entirely different kind of a beast, which Dr. Scott termed a "most amazing imitation of a sabertooth." Once before, an imitation sabertooth of still another kind of animal had been found in South America.

This repetition of the sabertooth anatomy and way of life in three widely different kinds of animals, Dr. Scott explained, constitutes a striking case of what scientists call convergent evolution. The probabilities are almost nil that such near identity could take place on a basis of purely chance variations, as is postulated by the natural selection theory of Darwin.

*Science News Letter, November 28, 1936*

### STANDARDS

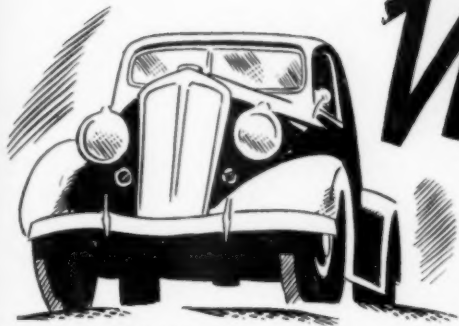
## Agree on 16-Millimeter Motion Picture Film

A WORLD-WIDE agreement which makes it possible to interchange sound motion picture film and equipment of the 16-millimeter, home movie type, is announced by the American Standards Association. The standards of America are adopted.

*Science News Letter, November 28, 1936*

An inch was originally as long as a man's thumb is broad.



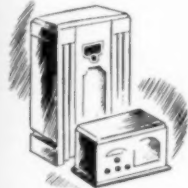


### 1937 AUTOMOBILES

Everyone who is considering the purchase of a new car during the coming year should first read the technical appraisal of the new models by Consumers Union automotive consultants appearing in the current issue of *Consumers Union Reports*. It will be followed, in an early issue, by ratings of the different makes as "Best Buys," "Also Acceptable," and "Not Acceptable."

### 1937 RADIOS

"Tone quality only fair . . . Hum level high . . . Dial calibration spotty . . . Tuning eye insensitive and useless . . . Obviously this receiver had never been adequately inspected . . ." This excerpt—from the report on 1937 radios also in the current issue—refers to one of the ten models listed as "Not Acceptable." Over thirty models (including Philco, Emerson, RCA, Midwest, etc.) are rated—many as "Best Buys" or "Also Acceptable."



### CHILDREN'S SHOES

A report on children's shoes in this issue tells which brands wear best and gives medical experts' advice on fitting the child's feet; how much to allow for growth, etc. Twelve brands, including Thom McAn, Edwards, Pediforme, and Endicott Johnson, are rated—two of them as "Best Buys."

The current issue of the *Reports* also rates leading brands of electric toasters and baking powders; and gives you money-saving information on other products, too.



### LEADING REPORTS IN PAST ISSUES

Here are a few of the leading reports in past issues of *Consumers Union Reports* (complete editions). You may begin your membership with any of these issues—simply write the month desired in the coupon. For an additional 50c a binder especially made for the *Reports* will be sent to you.

MAY—toilet soaps, grade A versus grade B milk, breakfast cereals.

JULY—refrigerators, used cars, motor oils, bathing suits.

SEPT.—shoes, tires, whiskies, women's coats, rubbers.

JUNE—automobiles, gasolines, moth preventives, vegetable seeds.

AUG.—oil burners and stokers, hosiery, white breads, laundry soaps.

OCT.—shirts, gins, brandies, cordials, electric razors, dentifrices.

# Which Brands are BEST BUYS?

## A NATION-WIDE CONSUMER ORGANIZATION GIVES YOU THE ANSWERS

EIGHTEEN THOUSAND consumers have discovered a new way to save money. They have joined Consumers Union of United States—a nation-wide, non-profit organization set up to provide accurate, *unbiased*, technical information about products in everyday use. Consumers Union's technical staff, aided by impartial consultants, tests hundreds of articles—gasolines, shoes, cosmetics, foods—practically everything used in and around the home.

The results of these tests are published each month in *Consumers Union Reports*—with ratings of products, by brand name, as "Best Buys," "Also Acceptable," and "Not Acceptable." By following these recommendations you can avoid mistakes *before* you buy instead of regretting them afterward.

A year's membership in Consumers Union costs but \$3 (\$1 for the limited edition) and entitles you to twelve issues of *Consumers Union Reports* plus a YEARLY BUYING GUIDE now in preparation. (Note:—The limited \$1 edition of the *Reports* covers only the less expensive types of products.)

### CONSUMERS UNION OF U.S.

A strictly non-profit organization, Consumers Union has absolutely no connection with any commercial interest. Its income is derived solely from its members. Its president is Professor Colston E. Warne, of Amherst; its director, Arthur Kallet, co-author of *100,000,000 Guinea Pigs*; its technical supervisor, D. H. Palmer. On its board of directors and among its sponsors are many prominent scientists, educators and journalists.

You are invited to become a member of this organization. The coupon below will bring you the current *Reports* at once—or, if you wish, you may begin with any of the earlier issues listed at the left. Simply write the month desired on the coupon and mail it in today.

### AN UNUSUAL CHRISTMAS GIFT

If you are looking for a Christmas gift of lasting value for your husband, wife, parents, or friends, give them a year's membership in Consumers Union. Simply send us their names and addresses—with a \$3 remittance for each membership—and your own name and address. We will start the gift with the December issue—timed to arrive just before Christmas—or, for 50c extra to cover the cost of a binder (\$3.50 in all), a complete set of *Consumers Union Reports* dating from our first issue (May, 1936) will be sent, to be followed by subsequent issues through next April. An appropriate card with your name as the donor will be enclosed.

## MAIL THIS APPLICATION

To: CONSUMERS UNION OF U. S., Inc., 55 Vandam Street, New York, N. Y.

I hereby apply for membership in Consumers Union. I enclose:

- ☐ \$3 for one year's membership, \$2.50 of which is for a year's subscription to the complete edition of *Consumers Union Reports*. Subscriptions without membership are \$3.50.
- ☐ \$1 for one year's membership, 50c of which is for a year's subscription to the limited edition of *Consumers Union Reports*. (Note:—the reports on automobiles and higher-priced radios are not in this edition.)
- ☐ I also enclose . . . . . (\$2 to \$25) as a contribution toward a permanent consumers' laboratory.

I agree to keep confidential all material sent to me which is so designated.

Please begin my membership with the . . . . . issue.

Signature . . . . . Occupation . . . . .

Address . . . . .

City and State . . . . . LD

# •First Glances at New Books

## Psychology

**PSYCHOLOGY AND THE SOCIAL ORDER, AN INTRODUCTION TO THE DYNAMIC STUDY OF SOCIAL FIELDS**—J. F. Brown—*McGraw-Hill*, 529 p., \$3.50. The new tendency to consider political science as a legitimate part of the science of psychology, revealed when the American Psychological Association at its latest meeting included special papers dealing with this problem, is reflected in this new textbook. A political science section is practical and up to date enough to consider the present conflict in Europe between the different types of state. Of the author's own attitude, he says, "I admit an antifascist bias, because it is daily more obvious that fascism is antiscientific. Even the most 'disinterested' scientist after all must believe in science."

*Science News Letter*, November 28, 1936

## Archaeology

**THE LAW AND THE PROPHETS**—Harold Peake and Herbert John Fleure—*Yale Univ. Press*, 188 p., \$2. The ninth and concluding volume of the *Corridors of Time* series. The authors choose, as the trademark of the age in this last volume, the growing cry for ethical teaching. They describe the rise of law and philosophy in Greece, the prophets of Israel, Persian ideals of justice, and other phenomena which brought civilization to a new dispensation in its religious and ethical thought.

*Science News Letter*, November 28, 1936

## Botany

**PLANTS OF YELLOWSTONE NATIONAL PARK**—W. B. McDougall and Herma A. Baggley—*Govt. Print. Off.*, 160 p., 25c. Yellowstone, to persons who have been there, means much more than geysers and a canyon; it means galaxies of flowers crowding rich mountain meadows, scattered stars of flowers that defy the little Saharas of steaming winter. A book that can be used with pleasure by tourists and with scientific profit by serious botanists has long been lacking; now happily it is supplied.

*Science News Letter*, November 28, 1936

## Ancient History

**THE ROMAN'S WORLD**—Frank Gardner Moore—*Columbia Univ. Press*, 502 p., 47 illus., \$3.75. Seen through the expert guidance of Prof. Moore, the life and customs of ancient Rome become a rich panorama of interesting "sights." But the volume has greater significance

than mere interest, in view of the importance of the Roman world in shaping western civilization. Prof. Moore includes not merely the homely aspects of a Roman's life, but takes in the larger range of political and social phenomena, and shows how Roman thought changed from era to era.

*Science News Letter*, November 28, 1936

## Hobbies

**TREATISE ON THE ART OF AMATEUR LAPIDARY**—Charles L. Shimmel—*published by author*; Madera, Calif., 30 p., \$1. Guide to a fascinating hobby that deserves more devotees than it has—the more so since it can eventuate in profit as well as pleasure.

*Science News Letter*, November 28, 1936

## Child Training

**THE BIRTHRIGHT OF BABYHOOD**—Clarence Wesley Sumner—*Nelson*, 85 p., \$1. Telling how to introduce babies and children under five to the best of the literature suited to their months. The list of sources for lullabies, finger games, pictures, rhymes, and stories for the very young will be welcomed by those who are acquainted with young children or who wish to revive memories of their own childhood. The book is written by the librarian of the Youngstown Public Library, to whom credit goes for instituting the Mother's Room.

*Science News Letter*, November 28, 1936

## Textiles—Testing

**A.S.T.M. STANDARDS ON TEXTILE MATERIALS**—*American Society for Testing Materials*, 294 p., \$2.

*Science News Letter*, November 28, 1936

## Engineering

**A.S.T.M. STANDARDS ON COAL AND COKE**—*American Society for Testing Materials*, 143 p., \$1.25.

*Science News Letter*, November 28, 1936

## Entomology

**CONTROL OF THE JAPANESE BEETLE AND ITS GRUB IN HOME YARDS**—W. E. Fleming and F. W. Metzger—*Govt. Print. Off.*, 15 p., 5c. (Obtainable by ordering directly from the Government Printing Office, Washington, D. C.)

*Science News Letter*, November 28, 1936

## Criminology

**THE POLICE AND MODERN SOCIETY**—August Vollmer—*Univ. of California Press*, 253 p., \$2.50. Written by a man who has done much to further the introduction of scientific methods into the business of administration of justice. Two chapters on traffic and on crime prevention will be of particular interest to the general reader.

*Science News Letter*, November 28, 1936

## Satire

**THE AUTOBIOGRAPHY OF A SCIENTIST**—Anonymous—*Scientific Publishing Co.*, 177 p., \$2. Ribald and imaginary accounts of scientific goings-on at Derbytown University. At that, it is not a bad antidote to some scientific papers.

*Science News Letter*, November 28, 1936

## Agriculture—Economics

**ELEMENTS OF FARM MANAGEMENT**—John A. Hopkins—*Prentice-Hall*, 390 p., \$2.20. A compact but complete textbook on farming, by a faculty member at Ames—where they know about farming, if they do anywhere.

*Science News Letter*, November 28, 1936

## Engineering

**SYMPOSIUM ON HIGH-STRENGTH CONSTRUCTIONAL METALS**—*American Society for Testing Materials*, 126 p., \$1.25.

*Science News Letter*, November 28, 1936

## Horticulture

**GARDEN FLOWERS IN COLOR: A PICTURE CYCLOPEDIA OF FLOWERS**—G. A. Stevens—*Macmillan*, 320 p., colored illus., \$3.75. A book for gardeners and flower lovers. Brief descriptions supplement strikingly colored illustrations.

*Science News Letter*, November 28, 1936

## Statistics

**STATISTICAL METHODS IN BIOLOGY, MEDICINE AND PSYCHOLOGY (4th ed.)**—C. B. Davenport and Merle F. Ekas—*John Wiley*, 216 p., \$2.75. Condensed to a handy size, this text and reference book contains no superfluous wordage. It does contain, in addition to the skeletonized text, helpful reference tables, an index, and a bibliography.

*Science News Letter*, November 28, 1936

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